

Appl. No. : 10/829,638
Filed : April 22, 2004

AMENDMENTS TO THE CLAIMS

By this response, Applicants are amending Claim 9. Claims 1-8 and 10-38 remain as originally filed.

1. (Original) An apparatus comprising:
 - at least one wafer-processing chamber wherein an ozone-rich environment exists within the wafer-processing chamber;
 - a rotator that creates a gap between a wafer and a wafer cassette, wherein the rotator is configured to rotate the wafer;
 - a sprayer; and
 - a pulsating fluid source, the pulsating fluid source configured to pulse a solution through the sprayer into the ozone-rich environment while the wafer is rotating.
2. (Original) The apparatus of Claim 1, wherein the wafer cassette remains stationary while the wafer is rotating.
3. (Original) The apparatus of Claim 1, wherein the rotator rotates the wafer at a velocity of less than 100 rotations per minute (RPM).
4. (Original) The apparatus of Claim 1, wherein the solution is ozone rich.
5. (Original) The apparatus of Claim 1, wherein the sprayer comprises a plurality of spray nozzles.
6. (Original) The apparatus of Claim 1, wherein the pulsating fluid source is configured to pulse at approximately one pulse every two seconds.
7. (Original) The apparatus of Claim 1, wherein the pulsating fluid source has a 50% duty cycle.
8. (Original) The apparatus of Claim 1, wherein the pulsating fluid source has a duty cycle that varies from 3% to 97%.
9. (Currently Amended) The apparatus of Claim [[9]] 1, wherein the wafer is located between the sprayer and the rotator.

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10. (Original) An apparatus for processing a wafer, the apparatus comprising:
a semiconductor processing chamber;
a rotator configured to rotate at least one wafer within the semiconductor processing chamber; and

a pulsating fluid source, the pulsating fluid source configured to pulse an ozone-rich solution into the semiconductor processing chamber more than once while the wafer is rotating within the semiconductor processing chamber.

11. (Original) The apparatus of Claim 10, wherein the rotator comprises at least one rod that contacts an outside edge of the wafer.

12. (Original) The apparatus of Claim 11, wherein the at least one rod supports the wafer.

13. (Original) The apparatus of Claim 10, wherein the semiconductor processing chamber is rotated by the rotator.

14. (Original) The apparatus of Claim 10, wherein the pulsating fluid source further comprises a pump configured to pulse the ozone-rich solution.

15. (Original) The apparatus of Claim 14, wherein the rotator is further configured to rotate the wafer at more than one speed.

16. (Original) The apparatus of Claim 10, wherein the temperature of the solution is between approximately 20°C and approximately 95°C.

17. (Original) An apparatus comprising:
a rotating platform configured to rotate a workpiece; and
a pulsator configured to introduce multiple pulses of an ozone-rich solution onto the workpiece while the workpiece is rotating.

18. (Original) The apparatus of Claim 17, wherein the workpiece comprises a wafer.

19. (Original) The apparatus of Claim 17, wherein the workpiece is rotated at a speed less than approximately 100 rotations per minute (RPM).

20. (Original) The apparatus of Claim 17, wherein the pulsator has a 50% duty cycle.

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21. (Original) The apparatus of Claim 17 wherein the pulsator has an 8% duty cycle.

22. (Original) The apparatus of Claim 17, wherein the pulsator comprises a pump.

23. (Original) An ozone shower system for cleaning a semiconductor wafer, the system comprising:

a process chamber configured to house a wafer;

a rotator within the process chamber, wherein said rotator is configured to rotate the wafer; and

a sprayer connected to an ozone-enriched fluid source, wherein the sprayer is configured to pulse the ozone-enriched fluid multiple times on the wafer during the rotation of the wafer.

24. (Original) The ozone shower system of Claim 23, wherein the rotator comprises at least one axle.

25. (Original) The ozone shower system of Claim 24, wherein the at least one axle contacts the outside edge of the wafer.

26. (Original) The ozone shower system of Claim 24, wherein the rotator comprises two axles.

27. (Original) The ozone shower system of Claim 23, wherein the sprayer comprises a plurality of spray nozzles.

28. (Original) The ozone shower system of Claim 23, wherein the ozone fluid is at a temperature between approximately 20° and approximately 95°C.

29. (Original) The ozone shower system of Claim 23, wherein the wafer is positioned between the rotator and the sprayer.

30. (Original) The ozone shower system of Claim 23, wherein the rotation of the wafer is caused in part by the pulsating ozone-enriched fluid.

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31. (Original) An apparatus for delivering ozone to multiple wafers, the apparatus comprising:

a means for rotating multiple wafers within a semiconductor processing chamber; and

a means for pulsating an ozone-rich solution multiple times onto the multiple wafers while the multiple wafers are being rotated.

32. (Original) The apparatus of Claim 31, wherein the means for rotating comprises at least one rod.

33. (Original) The apparatus of Claim 31, wherein the means for pulsating comprises a pump.

34. (Original) The apparatus of Claim 31, wherein the multiple wafers are located between the means for rotating and the means for pulsating.

35. (Original) The apparatus of Claim 31, wherein the semiconductor processing chamber comprises a wafer cassette.

36. (Original) The apparatus of Claim 31, wherein the means for rotating creates a gap between the multiple wafers and the wafer cassette.

37. (Original) The apparatus of Claim 31, wherein the semiconductor processing chamber remains stationary while the multiple wafers are being rotated.

38. (Original) The apparatus of Claim 31, wherein the means for rotating is configured to rotate the multiple wafers at multiple speeds.